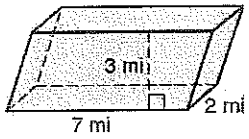
KEY

LESSON 21-1

Volume of Prisms and Cylinders

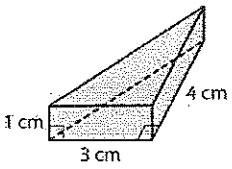
Practice and Problem Solving: A/B

Find the volume of each prism. Round to the nearest tenth if necessary.

1. 

the oblique rectangular prism

42 mi³

2. 

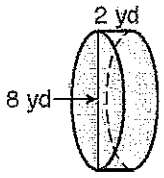
$\left[\frac{1}{2}(4)(3)\right]$ 3

the right triangular prism

6 cm³

3. a cube with edge length 0.75 m $V=(.75)^3 = .42 m^3$

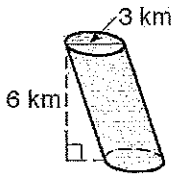
Find the volume of each cylinder. Give your answers both in terms of π and rounded to the nearest tenth.

4. 

r = 4 yd

$\pi(4)^2 \cdot 2$

$32\pi\ yd^3$ / 100.5 yd^3

5. 

r = 1.5

$\pi(1.5)^2 \cdot 6$

$13.5\pi\ km^3$ / 42.4 km^3

6. a cylinder with base circumference 18π ft and height 10 ft

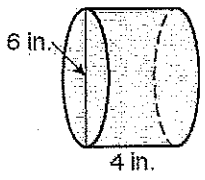
$18\pi = 2\pi r$

$9 = r$

$\pi 9^2 \cdot 10$

$810\pi\ ft^3$ / 2544.7 ft^3

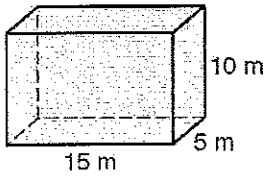
Describe the effect of each change on the volume of the given figure.

7. 

r = 3

The dimensions are halved.

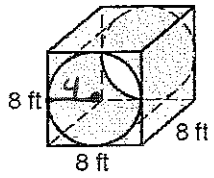
÷ 8

8. 

The dimensions are divided by 5.

÷ 125

Find the volume of each composite figure. Round to the nearest tenth.

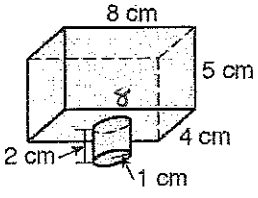
9. 

$V = 8^3$ 512

$-\ \pi 4^2 8$ - 402.1

109.9

109.9 ft^3

10. 

160

+ 2π

166.3 cm^3

Name KEY Date _____ Class _____

LESSON 21-2

Volume of Pyramids

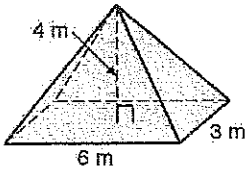
Practice and Problem Solving: A/B

Write each formula.

1. volume of a pyramid with base area B and height h $V = \frac{1}{3}Bh$

2. volume of a square pyramid with base edge s and height h $V = \frac{1}{3}s^2h$

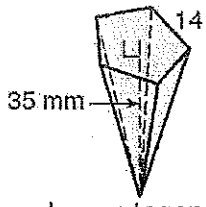
Find the volume of each pyramid. Round to the nearest tenth.

3. 

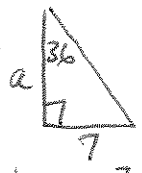
$V = \frac{1}{3}(6 \cdot 3) \cdot 4$

rectangular pyramid

$24 m^3$

4. 

$V = \frac{1}{3}\left(\frac{1}{2}aP\right)35$
$= \frac{1}{3}\left(\frac{1}{2} \cdot 9.6 \cdot 70\right)35$



$\tan 36 = \frac{7}{a}$
$a = 9.6$

regular pentagonal pyramid

$3920 mm^3$

5. a square pyramid with side length 10 in. and height 12 in. $\frac{1}{3} \cdot 10^2 \cdot 12$ $400 in^3$

6. an octagonal pyramid with base area 27 ft^2 and height 6 ft $\frac{1}{3} \cdot 27 \cdot 6$ $54 ft^3$

Find the missing measure. Round to the nearest tenth.

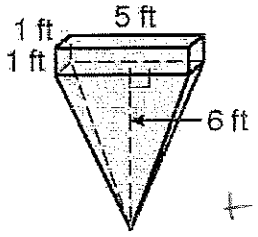
$21 = \frac{1}{3}\boxed{s^2}3$

7. Given a square pyramid with a height of 3 in. and a volume of 21 in., find the length of one side of the square base. $4.6 in$

$13 = \frac{1}{3}(7)h$

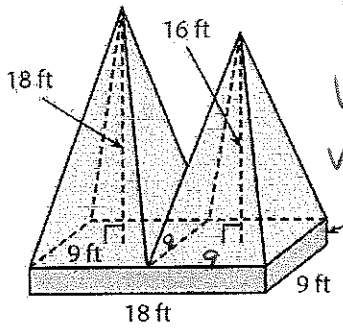
8. Find the height of a triangular pyramid with a volume of 13 m^3 and a base area of 7 m^2. $h = 5.6 m$

Find the volume of the composite figures.

9. 

$V = \frac{1}{3}(1.5)6$
$= 10 ft^3$
$+ V = 5 \cdot 1 \cdot 1$
$= 5 ft^3$

$15 ft^3$

10. 

$V = 18 \cdot 9 \cdot 2 = 324$
$V = \frac{1}{3}\,9^2(16) = 432$
$V = \frac{1}{3}\,9^2(18) = 486$

$1242 ft^3$

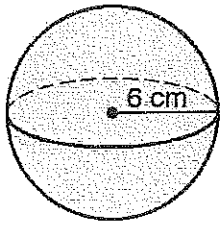
Name KEY Date _____ Class _____

LESSON 21-4

Volume of Spheres

Practice and Problem Solving: A/B

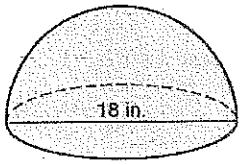
Find each measurement. Give your answers in terms of π.

1. 

$\frac{4}{3}\pi 6^3$

the volume of the sphere

$288\pi \approx 904.8$ cm^3 cm^3

2. 

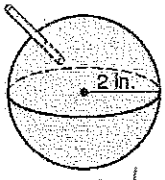
$\frac{1}{2}\ \frac{4}{3}\pi 9^3$

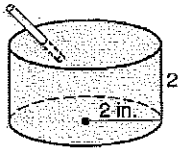
the volume of the hemisphere

$486\pi\ in^3 \approx 1526.8\ in^3$

3. the radius of a sphere with a volume of $36{,}000\pi\ mm^3$ $= \frac{4}{3}\pi r^3$ $27000 = r^3$ $r = 30\ mm$

4. Margot is thirsty after a 5-km run for charity. The organizers offer the containers of water shown in the figure. Margot wants the one with the greater volume of water. Tell which container Margot should pick.



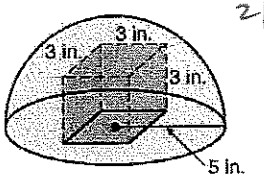


$\frac{4}{3}\pi 2^3$ 33.5

$\pi(2^2)2$ 25.1

Sphere

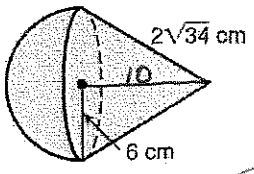
Find the volume of each composite figure. Round your answers to the nearest tenth.

5. 

$\frac{1}{2}\left[\frac{4}{3}\pi 5^3\right] - 3^3$

$261.8 - 27$

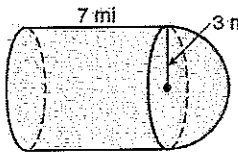
$234.8\ in^3$

6. 

$\frac{1}{2}\left[\frac{4}{3}\pi 6^3\right] + \frac{1}{3}(\pi 6^2)10$

$452.4 + 377$

$829.4\ cm^3$

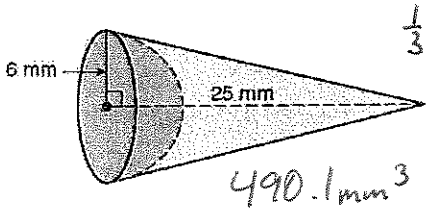
7. 

$\pi(3^2)7 + \frac{1}{2}\left[\frac{4}{3}\pi 3^3\right]$

18π

$197.9 + 56.5$

$254.4\ mi^3$

8. 

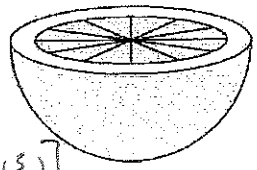
$\frac{1}{3}\pi r^2 h - \frac{1}{2}\left[\frac{4}{3}\pi r^3\right]$

$\frac{1}{3}\pi(6^2)25 - \frac{1}{2}\left[\frac{4}{3}\pi 6^3\right]$

$942.5 - 452.4$

$490.1\ mm^3$

9. The figure shows a grapefruit half. The radius to the outside of the rind is 5 cm. The radius to the inside of the rind is 4 cm. The edible part of the grapefruit is divided into 12 equal sections. Find the volume of the half grapefruit and the volume of one edible section. Give your answers in terms of π.



$\frac{1}{2}\left[\frac{4}{3}\pi(5^3)\right] = 261.8\ cm^3$

$\frac{\frac{1}{2}\left[\frac{4}{3}\pi(4^3)\right]}{12} = 11.2\ cm^3$

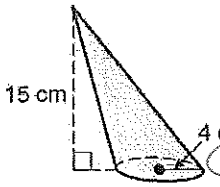
Name KEY Date _____ Class _____

LESSON 21-3

Volume of Cones

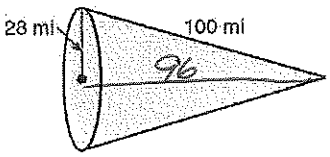
Practice and Problem Solving: A/B

Find the volume of each cone. Give your answers both in terms of π and rounded to the nearest tenth.

1. 

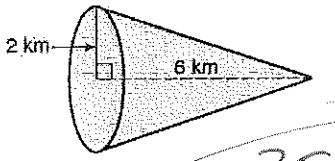
$V = \frac{1}{3}(\pi 4^2)15$

$= 251.3 cm^3$

2. 

$V = \frac{1}{3}[\pi(28^2)]96$

$78,816.3 mi^3$

3. 

$\frac{1}{3}(\pi 2^2)6$

$25.1 km^3$

4. a cone with diameter 15 yd and height 10 yd

$r = 7.5$

$V = \frac{1}{3}[\pi(7.5)^2]10$

$589.04 yd^3$

5. a cone with base circumference 6π meters and a height equal to half the radius

$6\pi = 2\pi r$

$3 = r \quad h = 1.5$

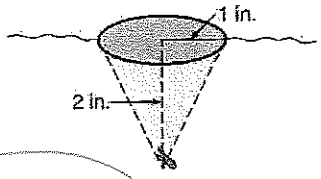
$\frac{1}{3}[\pi 3^2]1.5$

$14.1 m^3$

6. Compare the volume of a cone and the volume of a cylinder with equal height and base area.

$\frac{1}{3}$

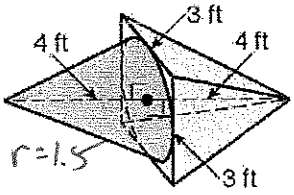
7. An ant lion is an insect that digs cone-shaped pits in loose dirt to trap ants. When an ant tumbles down into the pit, the ant lion eats it. A typical ant lion pit has a radius of 1 inch and a depth of 2 inches. Find the volume of dirt the ant lion moved to dig its hole. Round to the nearest tenth.



$\frac{1}{3}[\pi 1^2]2$

$2.1 in^3$

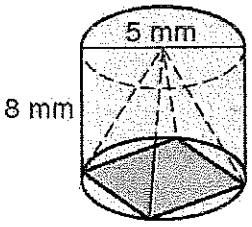
Find the volume of each composite figure. Round to the nearest tenth.

8. 

$\frac{1}{3}\pi(1.5)^2 4 + \frac{1}{3} 3^2 4$

$9.42 + 12$

$21.4 ft^3$

9. 

$r = 2.5$

$x^2 + x^2 = 5^2$

$2x^2 = 25$

$x = 3.5$

$\pi(2.5)^2 8 - \frac{1}{3}(3.5)^2 8$

$157.1 - 32.7$

$124.4 mm^3$